AMENDMENTS TO THE CLAIMS

The claims in this listing will replace all prior versions, and listings, of claims in the present application

1. (Original) A discharge lamp lighting control device, comprising:

a DC power converter that converts an AC power source to a rectified voltage;

a power factor improving power converter (PFIPC) having a switching device, a power factor improver, and a power converter, said power factor improver smoothing said rectified voltage by storing energy in a first inductive device and by discharging energy from a second inductive device, said second inductive device being magnetically connected to said first inductive device, said storing and discharging being performed by turning ON and OFF said switching device, said power converter producing a predetermined DC voltage, said predetermined DC voltage being converted from said smoothed voltage by energy stored and discharged by a third inductive device in response to said turning ON and OFF of said switching device;

a polarity reversing circuit that converts said predetermined DC v oltage into a square-wave AC voltage that is applied to a lamp;

a starter circuit that uses an output of said polarity reversing circuit as a power source to ignite the lamp by applying a high voltage pulse to the lamp; and

a controller that controls said PFIPC and said polarity reversing circuit.

2. (Original) The lighting control device of claim 1, wherein said power factor improver further comprises a first capacitive device that smooths said rectified voltage

converted from the AC power source, and wherein said power converter further comprises a second capacitive device that enables a stable lighting of the lamp.

3. (Original) The lighting control device of claim 2, wherein said power factor improver stores electrical energy in said first inductive device when said switching device is ON, and charges said first capacitive device via said second inductive device, with electrical energy stored in said first inductive device when said switching device is OFF.

4. (Original) The lighting control device of claim 2, wherein said power converter further comprises a third inductive device that stores electrical energy with energy stored in said first capacitive device when said switching device is ON, and charges said second capacitive device with energy stored in said third inductive device when said switching device is OFF.

5. (Original) The lighting control device of claim 1, wherein said power factor improver comprises:

said first inductive device, a first terminal of said first inductive device being electrically connected to a positive polarity side of an input power source;

a first diode having a cathode electrically connected to a remaining terminal of said first inductive device; and

a circuit comprising said second inductive device having a first terminal electrically connected to an anode of said first diode, said second inductive device being magnetically coupled to said first inductive device, a second diode having a cathode

electrically connected to a remaining terminal of said second inductive device, and a first capacitive device electrically connected parallel to a series circuit formed by said second inductive device and said second diode; and

wherein said power converter comprises:

a third diode having an anode electrically connected to an anode of said second diode;

a second capacitive device having a first terminal electrically connected to a cathode of said third diode; and

a third inductive device electrically connected between a remaining terminal of said second capacitive device and said anode of said third diode, wherein a junction of said second capacitive device and said third inductive device is electrically connected to a negative polarity side of said input power source; and

wherein said switching device is provided between a junction of said first inductive device and said first diode, and said negative polarity side of said input power source.

6. (Original) The lighting control device of claim 5, further comprising a fourth diode having a cathode electrically connected to a junction of said first diode and said first capacitive device, an anode of said forth diode being electrically connected to the negative polarity side of said input power source.

7. (Original) The lighting control device of claim 1, wherein said switching device comprises a single switch element.

8. (Original) The lighting control device of claim 1, wherein said switching device comprises a first switch element and a second switch element, said first switch element being electrically connected to said first inductive device, said second switch element being electrically connected to said second inductive device, said first switch element and said second switch element being simultaneously turned ON and OFF by said controller.

9. (Original) The lighting control device of claim 1, wherein a turning ON and OFF of said switching device is controlled so that a first current associated with said first inductive device has a first time period in which the first current equals zero, and a second current associated with said second inductive device has a second time period in which the second current value equals zero, at least a portion of said first time period and at least a portion of said second time period overlapping.

10. (Original) The lighting control device of claim 4, wherein a turning ON and OFF of said switching device is controlled so that a first current associated with said first inductive device has a first time period in which the first current equals zero, and a second current associated with said second inductive device has a second time period in which the second current value equals zero, at least a portion of said first time period and at least a portion of said second time period overlapping, said turning ON and OFF of said switching device being controlled so that a third current associated with said third inductive device has a third time period in which the third current value equals zero.

11. (Original) The lighting control device of claim 10, wherein said switching device is switched at a fixed frequency to control a duty ratio according to an output voltage and an output current of said PFIPC.

12. (Original) The lighting control device of claim 10, wherein an ON-time of said switching device is maintained substantially constant during at least a half period of the AC power source.

13. (Original) The lighting control device of claim 10, wherein said PFIPC is controlled to output a constant voltage at a predetermined value when the lamp is not lit, and when the lamp is lit, to one of output a constant current at a certain value when an output voltage is below the predetermined value and output a constant power at a selected value when the output voltage is above the predetermined value.

14. (Original) The lighting control device of claim 13, wherein a switching frequency of said switching device is lowered so that a current associated with said first inductive device has a first time period in which a current value equals zero, and a current associated with said second inductive device has a second time period in which the current value equals zero, as the output voltage is decreased, when the output voltage is below a predetermined value in a lighting state of the lamp, at least a portion of said first time period and at least a portion of said second time period overlapping.

15. (Original) The lighting control device of claim 4, wherein a turning ON and OFF of said switching device is controlled so that a first current associated with said first inductive device has a first time period in which the first current equals zero, and a second current associated with said second inductive device has a second time period in which the second current value equals zero, at least a portion of said first time period and at least a portion of said second time period overlapping, a turning ON and OFF of said switching device being controlled so that a current associated with a third inductive device becomes a continuous current having no time period in which the current value equals zero.

16. (Original) The lighting control device of claim 15, wherein said switching device is switched at a fixed frequency to control a duty ratio of said switching device according to an output voltage and an output current of said PFIPC.

17. (Original) The lighting control device of claim 15, wherein an ON-time of said switching device is maintained substantially constant during at least a half period of the AC power source.

18. (Original) The lighting control device of claim 15, wherein said PFIPC outputs a constant voltage at a predetermined value when the lamp is not lit, and when the lamp is lit, one of outputs a constant current at a certain value when an output voltage is below the predetermined value, and outputs a constant power at a selected value when the output voltage is above the predetermined value.

19. (Original) The lighting control device of claim 18, wherein a switching frequency of said switching device is lowered so that a current associated with said first inductive device has a first time period in which the current equals zero, and a current associated with said second inductive device has a second time period in which the current equals zero, as the output voltage is decreased, when the output voltage is below the predetermined value in a lighting state of the lamp, at least a portion of said first time period and at least a portion of said second time period overlapping.

20. (Original) The lighting control device of claim 1, wherein an output of said starter circuit comprises a resonance boosting voltage.

21. (Original) The lighting control device of claim 20, wherein said resonance boosting voltage is obtained when said polarity reversing circuit applies a square-wave AC voltage having an amplitude of an output voltage of said PFIPC to an inductor-capacitance series resonance circuit.

22. (Original) The lighting control device of claim 20, wherein said resonance boosting voltage is obtained when said polarity reversing circuit applies a square-wave AC voltage to an inductor-capacitance (LC) series resonance circuit, said square-wave AC voltage having an amplitude substantially equal to twice an output voltage of said PFIPC.

23. (Original) The lighting control device of claim 21, wherein said resonance boosting voltage is obtained when a frequency of a square-wave AC voltage is approximated to a value that divides a natural resonance frequency of an inductor-capacitance (LC) series resonance circuit by a predetermined odd number.

24. (Original) The lighting control device of claim 1, wherein said PFIPC further comprises a fourth inductive device, magnetically coupled to said first inductive device and said second inductive device, that provides a voltage supply to said controller.

25. (Original) The lighting control device of claim 24, wherein a predetermined constant voltage output value of an output voltage of said PFIPC is increased only during a time period in which said voltage supply is below a predetermined value.

26. (Cancel)

27. (Original) A power factor improving power converter of a discharge lamp lighting control device, comprising:

a switching device;

a power factor improver; and

a power converter, a DC voltage being smoothed by storing energy in a first inductive device and by discharging energy from a second inductive device, said second inductive device being magnetically coupled to said first inductive device, said storing and discharging of said DC voltage being performed by adjusting an ON-time of said

switching device, said power converter producing a predetermined DC output voltage that is converted from said smoothed voltage by energy stored and discharged by a third inductive device in response to said ON-time of said switching device.